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(54) Picture reproducing device and method

Vorrichtung und Methode zur Wiedergabe von Bildern

Dispositif et procédé de reproduction d'images

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- **PATENT ABSTRACTS OF JAPAN vol. 15, no. 70 (E-1035) 19 February 1991 & JP-A-02 292 973 (MINOLTA CAMERA CO.,LTD.) 4 December 1990**
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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] This invention relates to a picture reproducing device and method for reproducing the information including the compressed picture information presented by the communication or the information recording media, such as a CD-ROM.

2. Description of the Related Art

[0002] The picture reproducing device for reproducing the customary picture information, such as the information presented by the CD-ROM, may be roughly classified into two type devices. One such device is that in which only the picture information, such as the information of letters or pictures to be reproduced, is recorded on the CD-ROM in a pre-set form and is reproduced by a fixed program stored in the reproducing device. Examples of this type of the device include a disc player type reproducing device for reproducing a disc having recorded thereon the information contained in a dictionary, such as an English-Japanese dictionary or a Japanese-English dictionary, or an encyclopedia, and displaying the reproduced information. The other reproducing device is that in which the information to be reproduced is recorded on the CD-ROM and the program for reproducing the recorded information is recorded as an object code for the CPU of the reproducing device, with the CPU in the reproducing device reproducing and executing the program for reproducing the information on the CD-ROM. Examples of this type of the device include the CD-I type picture reproducing device.

[0003] On the other hand, a demand has recently been raised for storing moving picture data continuing for a prolonged time on a recording medium such as the above-mentioned CD-ROM. Thus a variety of data compression techniques have been proposed for compressing the moving picture data for reducing the data volume for enabling a large quantity of the moving picture data to be stored on the recording medium. A variety of compressed picture reproducing devices for reproducing data from the recording medium having the compressed picture data compressed by these various data compression techniques stored thereon have also been proposed.

[0004] Meanwhile, with these reproducing devices, the menu items or the like as selected by the user are adapted to be displayed in a majority of cases by a graphic screen in the course of the reproduction.

[0005] If the menu items are displayed in this manner by the graphic screen, the following problems arise.

[0006] First, if the display image for graphic display of the menu items or the like is directly recorded on the information recording medium, the data volume recorded on the information recording medium is increased. If it is attempted to store the moving picture data continuing for a prolonged time on the information recording medium by employing the picture compression technique, the storage capacity is decreased in an amount corresponding to the data volume for the display picture, with the result that the objective of achieving prolonged time recording cannot be accomplished.

[0007] While it is possible to transform the displayed picture into e.g. vector data or picture-drawing instructions for recording on the information recording medium for possibly avoiding the data volume in connection with the above-mentioned first problem, it becomes necessary in this case to transform the vector data or the picture-drawing commands into the display data, which raises the second of the above-mentioned problems. The result is the processing speed during the reproduction being lowered and the necessity for a high-performance hardware for executing the processing operations.

[0008] Besides, a graphic display circuit is necessitated for performing the graphic display in connection with the first and second problems with consequent rise in production costs for the reproducing device by the graphic display circuit. With the reproducing device having the above-mentioned compressed picture reproducing function, production costs are similarly raised by the addition of the graphic display circuits.

SUMMARY OF THE INVENTION

[0009] In view of the above-depicted status of the art, it is an object of the present invention to provide a picture reproducing device in which there is no such problem as increase in the data volume, lowering of the processing speed or the necessity for providing a high-performance hardware, and in which production costs may also be lowered.

[0010] This object is achieved by an apparatus and a method as set out in the claims.

[0011] Besides, if the encoded picture data is the moving picture, the updated picture data recorded on the recording medium is the picture data re-written continuously. The updated picture data, thus re-written continuously, is repeatedly read from the updating picture data storage area of the memory means and continuously transmitted to the decoding means under control by the control means.

[0012] That is, the present invention provides a picture reproducing device in which the picture display for menu item display is performed by taking advantage of the decoder for compressed picture employed displaying the compressed moving/still picture for enabling menu data or the like to be displayed without employing the graphic display circuit.

[0013] With the picture display device of the present invention, since the updating picture data required for rewriting or display of the menu items or the like is the compressed and encoded data, a smaller storage ca-

pacity on the recording medium for the updating picture data suffices. On the other hand, since the encoded initial picture data and the updating picture data are displayed after being decoded by the compressed picture decoder, the graphic display unit is dispensed with, while the processing speed may also be increased without loading the CPU of the reproducing device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Fig.1 is a schematic block circuit diagram showing the arrangement of a picture reproducing device according to the present invention.

[0015] Fig.2 is a diagrammatic view for illustrating the initial picture data.

[0016] Fig.3 is a diagrammatic view for illustrating the updated picture data.

[0017] Fig.4 is a flow chart showing the flow of processing for menu selection.

[0018] Fig.5 is a diagrammatic view for illustrating the picture data correlated with the flow chart for menu selection.

[0019] Fig.6 shows a typical key input unit.

[0020] Fig.7 is a flow chart for illustrating the basic operation of the picture reproducing device according to the present invention.

[0021] Fig.8 is a block circuit diagram for illustrating details of an MPEG decoder.

[0022] Fig.9 is a diagrammatic view for illustrating the initial picture data and updated picture data arranged on disc sectors.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Referring to Fig.1, the picture reproducing device according to the present invention comprises a CD-ROM drive 6, as data fetching means, for fetching data from a recording medium, such as a CD-ROM disc I1, on which at least encoded initial picture data 11 shown in Fig.2 and encoded updating picture data P1 to P8 shown in Fig.3 are recorded, a RAM 30 constituting memory means having a storage capacity of at least one frame, a decoding unit for decoding the encoded picture data, and a CPU 1 for initially transmitting the initial picture data and subsequently transmitting the updating picture data to the decoder. The updating picture data includes all of possible patterns partially updating the initial picture given the presence of the initial picture.

[0024] The RAM 30 has an updating picture storage area 31 for transiently storing the updating picture data.

[0025] The picture reproducing device also has a key input unit 7, such as a keyboard. The CPU 1 fetches the updating picture data associated with the actuated key of the key input unit 7 from the updating picture data storage area 31 of the RAM 30 to transmit the fetched data to the decoding unit.

[0026] The decoding unit comprises an MPEG (Moving Picture Expert Group) decoder 5 for decoding the encoded picture data. For producing the encoded picture data, the input picture signals and the differential picture signals formed by taking a difference between the input picture signals and pictures produced by preset predictive coding, such as forward prediction, backward prediction or bi-directional prediction, are transformed into coefficient data of, for example, discrete cosine transform (DCT), followed by encoding.

[0027] Consequently, with the present embodiment, data of the intra-coded picture (I-picture) as prescribed by MPEG is employed as the initial picture data. On the other hand, data of the predictive-coded picture (P-picture) or data of the bidirectional predictive-coded picture (B-picture) is employed as the updating picture data. In Figs.2 and 3, I and P denote that the picture is the I-picture and the P-picture, respectively. In other words, the initial picture data is the intra-coded picture or I-picture and hence the picture may be constituted only from the data of the picture. Conversely, the updating picture data, which is the above-mentioned P-picture or the B-picture, are the picture data which cannot be meaningfully updated unless the initial picture is displayed. In the present embodiment, only the P-pictures are employed as the updated pictures.

[0028] With the picture reproducing device of the present invention, the CPU 1 mainly controls the key input unit 7 connected to a bus 8, the CD-ROM drive 6, the MPEG decoder 5 or a CRT display controller 9, while exchanging various data with various components of the device. The program employed for controlling by the CPU 1 is stored in a ROM 20. Data produced in the course of various arithmetic-logical operations performed by the CPU 1 are transiently stored in the RAM 30. Compressed picture data recorded on the CD-ROM 11 are decoded by the MPEG decoder 5 and transmitted via a picture buffer memory 4 so as to be displayed on a CRT display 10 controlled by the CRT display controller 9. The display 10 as the display means may be a liquid crystal display unit, in which case the controller 9 effects control adapted to liquid crystal display.

[0029] Meanwhile, the present embodiment is directed to selection of menu items displayed on the CRT display 10. For this reason, plural menu items as indicated by pictures or buttons for selection by the user are displayed on the CRT display 10 as initial pictures for menu item selection, as shown in Fig.2.

[0030] In the example shown in Fig.2, the items of four different animal species kept in a zoo, that is elephant (zo-san), giant panda (panda-san), giraffe (kirin-san) and rabbit (usagi-san), are displayed as the initial picture. That is, the respective items are indicated in the form of buttons H on which appear the letters indicating the various animal species.

[0031] On the other hand, the updating picture data P1 to P8 shown in Fig.3 are data for making partial rewriting of only selected ones of the respective items appearing on the respective buttons H of the initial picture

data I1 indicating the various items of the initial picture data I1. Meanwhile, the updating picture data P1, P3, P5 and P7 are the picture data with the buttons associated with the indications of "zo-san", "panda-san" , "kirin-san" and "usagi-san" being highlighted, or illuminated, while the updating picture data P2, P4, P6 and P8 are the picture data with the buttons associated with the indications of "zo-san", panda-san", "kirin-san" and "usagi-san" being displayed without highlighting, that is without illumination.

[0032] The menu selection of selecting one of the menu items indicating the four animal species is explained.

[0033] The flow of processing for menu selection according to the present embodiment is explained with reference to the flow chart of Fig.4 and the illustrative view of Fig.5 associated with Fig.4.

[0034] Referring to Figs.4 and 5, the initial picture data I1 shown at A in Fig.5 is read at step S7 by the CD-ROM drive 6 from a disc I1 and transmitted via the picture buffer memory 4 to the MPEG decoder 5. The initial picture data is the background picture, as described above, so that, in the present example of the menu of a zoo, the picture of the zoo, not shown, is simultaneously displayed as the background picture along with the display by the respective buttons H.

[0035] At the next step S8, the data of the updating picture data P1 to P8 shown in Fig.3 is read into the updating picture data storage area 31 of RAM 30. By so doing, the updating picture data may be promptly transmitted to the MPEG decoder for the next picture updating without the necessity of reading the data from the disc 11 by the CD-ROM drive 6.

[0036] After the step S8, control proceeds to the step S9 in which a pointer indicating the menu item which the user intends to select is displayed on a display screen of the CRT display 10. That is, the pointer in the present embodiment indicates the button which is about to be selected by the user. With the present pointer, this is indicated by highlighting the associated button. Instead of making the pointer indication by highlighting the display region of the buttons, the frames surrounding the display area of each button may be displayed, or a letter and/or a small-sized picture indicated in the display area of the button may be changed as time elapses. As an example of changing the small-sized picture displayed in the display area of the button indicating the picture of the elephant "zo-san", a picture of an elephant lying down may be changed to a picture of an elephant standing on its feet.

[0037] At the step S9, the updating picture data P1, in which one of the buttons H indicating "zo-san" is highlighted for indicating the initial position of the pointer, is transmitted to the decoder 5, as shown at B in Fig.5. This causes only the button for "zo-san" to be highlighted as the pointer on the display screen, as shown at C in Fig.5. At this time, the remaining buttons are not changed. This state is the "initial state of the menu". Although not shown, the background picture is also displayed in the picture of the initial state of the menu.

[0038] As the updating picture data, the updating picture data P1, P3, P5 and P7, with the respective buttons being highlighted, and the updating picture data P2, P4, P6 and P8, with the respective buttons not being highlighted, are in store, as described above. One of these updating picture data is selected and transmitted to the decoder 5 for highlighting the button associated with the selected one of the updating picture data P1, P3, P5 and P7 or resetting the button associated with the selected one of the updating picture data P2, P4, P6 and P8 to the non-highlighted state. If plural ones of the updating picture data are selected, the plural buttons associated with the selected picture data are simultaneously highlighted or reset to the non-highlighted state.

[0039] If continuously re-written updating picture data are prepared and transmitted continuously to the MPEG decoder 5, partial/whole moving pictures may also be prepared, as in the case of the moving pictures. Since these data are put on the RAM 30, repetition of uninterrupted moving pictures, which can be transmitted continuously, may also be realized.

[0040] If, at the next step S10, the user selects one of the displayed items, the key of the key input unit or the remote controller actuated by the user is read. Meanwhile, the key input unit 7 includes shift or movement keys U, D, L and R, indicating upward, downward, left and right directions, and a selection key S, as shown in Fig.6.

[0041] At the step S13, the CPU 1 decides whether or not the key actuated by the user is the movement key. If the result of decision is YES, that is if the key actuated by the user is the movement key for shifting the pointer indicating the highlighted button, it becomes necessary to shift the pointer from the currently pointed button, that is the highlighted button, towards the button positioned in the indicated direction. To this end, control proceeds to the step S11.

[0042] At the step S11, if the actuated key is the movement key R for movement towards right, the updating picture data P2, as shown at D in Fig.5, is transmitted to the decoder 5, so that the currently pointed and highlighted button is reset to the non-highlighted state. Simultaneously, at the step 512, the updating picture data P3 of highlighting the display area of the button associated with the display item of "panda-san" on the right-hand side of the button associated with the display item of "zo-san", as shown at E in Fig.5, is transmitted to the decoder 5, for highlighting the button to which the pointer-has been moved and which is now to be pointed. The sequence of transmitting these two data may be reversed from that described above, that is the sequence of the steps S11 and S12 may be reversed from that shown in Fig.4.

[0043] This causes the button associated with the display item "panda-san" now pointed by the pointer to be highlighted, as shown at F in Fig.5. After the step S12,

control reverts to the step S10.

[0044] The foregoing description has been made of an example in which the movement key R in Fig.6 is actuated and the result of decision in the step S13 is YES, If the result of decision at the step S13 is NO, control proceeds to the step S14.

[0045] At this step S14, a decision is given as to whether or not the selection key S shown in Fig.6 is actuated. If the result of decision at the step S14 is NO, control reverts to the step S10. If the key actuated by the user is the selection key S for menu item selection, a decision of YES is given at the step S14 to terminate the menu selection.

[0046] The flow chart of Fig.7 shows, in a simplified manner, the processing for picture reproduction which is performed by the picture reproducing device of the present invention. That is, if the user selects the desired menu item, the user shifts the pointer to the button associated with the item desired to be selected, for highlighting the button, and actuates the selection key for selecting the highlighted button, as shown in Fig.7. The reproducing device now performs the operation associated with the selected button. That is, the reproducing device reproduces the moving pictures for the highlighted button associated with the pointed menu item. For example, if the pointed menu item is "panda-san", as shown at F in Fig.5, the moving pictures of the giant panda are reproduced in a manner not shown.

[0047] In the illustrated embodiment, the updating picture data are stored in the updating picture data storage area 31 of the RAM 30. Alternatively, the updating picture data may also be stored in a similar storage area provided in the picture buffer memory 4.

[0048] Besides, while the picture buffer memory 4 and the decoder 5 are shown as separate components in the example of Fig.1, the picture buffer memory 4 may also be built in the decoder 5.

[0049] Fig.8 illustrates a concrete arrangement of the MPEG decoder 5. In the present example of Fig.8, the picture buffer memory 4 is mounted within the decoder 5 and the updating picture data storage area is provided within the buffer memory 4. In Fig.8, the same components as those shown in Fig.1 are denoted by the same reference numerals as those used in Fig.1.

[0050] Referring to Fig.8, there are at least three frame memories 61, 62 and 63 in the decoder 5. The data flow from the disc 11 as the information recording medium is separated into an audio data bitstream and a video data bitstream at an MPEG system portion 51. The audio data bitstream is processed by an MPEG audio processor 52 and thence supplied to downstream components, such as an amplifier or a loudspeaker, not shown.

[0051] The video data bitstream is stored once in the picture buffer memory 4 and thence supplied to a VLC decoder 53 which is a counterpart of a variable length encoder (VLC) used for MPEG picture encoding. The video data bitstream is separated by the VLC decoder 53 into various data, such as quantized DCT coefficients, macro-block type indicating data, picture type indicating data, that is data indicating the predictive-coded data, backward predictive-coded data or the bi-directionally predictive-coded data, or motion vector data. The macro-block is the encoding unit used in MPEG and is made up of six blocks, that is four neighboring luminance blocks, that is left, right, upper and lower luminance blocks, and two chroma blocks Cb, Cr located at the same position as the luminance blocks on the picture. Each of the above blocks is made up of neighboring 8 lines by neighboring 8 luminance or chroma pixels and represents a DCT unit.

[0052] Of the various data separated by the VLC decoder 53, the quantized DCT coefficients are transmitted to an inverse quantization circuit 54. The motion vector data is supplied to motion compensation circuits 59, 60 as later explained, while the macro-block type indicating data and the picture-type indicating data become respectively the switching control signals for a changeover switch 57 as later explained and switching control signals for a changeover switch 64 as later explained.

[0053] The inverse quantization circuit 54 performs an inverse quantization, an operation which is the reverse of the quantization as used for encoding, on the quantized DCT coefficients separated at the VLC decoder 53. The DCT coefficient data from the inverse quantization circuit 54, is transmitted to an IDCT circuit 55 for inverse DCT. The IDCT circuit 55 performs IDCT on the DCT coefficient data. By the IDCT, picture data is produced for the intra-coded picture (I-picture), while difference data corresponding to a output of the changeover switch 57 as later explained is produced for the predictive-coded picture (P-picture) or backward predictive-coded picture or bi-directional predictive-coded picture (B-picture). The picture data and the difference data are supplied to an additive node 56.

[0054] For the forward, backward and bi-directional prediction modes, motion-compensated predictive-coded picture data from half-pel motion compensation circuits 59, 60 or an averaging circuit 58 is supplied to the additive node 56 via the changeover circuit 57 which is changed over depending on the macro-block type. That is, the changeover switch 57 selects an output of the motion compensation circuit 60, an output of the motion compensation circuit 59 and an output of the averaging circuit 58 when the macro-block type corresponds to the forward predictive mode, backward predictive mode or to the bidirectional predictive mode, respectively. The motion compensated prediction-coded picture data and the difference data via the changeover switch 57 are added together by the additive node 56 to reproduce the picture data.

[0055] The picture data thus reproduced are stored in the frame memories 61, 62 and 63. If the picture is the I-picture, it is stored in the frame memory 61 or in the frame memory 62. If the picture is the P-picture, it is motion-compensated on the basis of the macro-blocks

stored in one of the frame memories 61 or 62 by an associated one of the motion compensation circuits 59, 60 and is transmitted via the changeover switch 57 to the additive node 56. This permits pixel values at the positions corresponding to the macro-block to be added to the picture to produce the picture data. The picture data produced in this manner is stored in the other frame memory. With the I-picture and the Picture, the two frame memories 61 and 62 are employed alternately. That is, during the processing of the I-picture and the P-picture, data of the frame memory in which data is not being written is outputted.

[0056] On the other hand, if the picture is the B-picture, the frame memories 61, 62 are used in a parallel manner for motion compensation. That is, with the B-picture data, the data read out from the two frame memories 61, 62 are transmitted to the associated motion compensation circuits 59, 60, respectively. The motion compensation circuits 59, 60 effect motion compensation, using the motion vector kept in store, and resulting predicted pixel values are transmitted to the averaging circuit 58. The averaging circuit 58 finds an average value which is supplied via the changeover switch 57 to the additive node 56. The playback picture thus produced is outputted after storage in the frame memory 63.

[0057] With the above-described constitution, it becomes possible to change the sequence of the decoded pictures.

[0058] The frame data from the frame memories 61, 62 and 63 is supplied to a changeover switch 64 the changeover operation of which is controlled depending on the picture type. If the picture type is the B-picture, the changeover switch 64 selects an output of the frame memory 63. If the picture type is the I-picture or the P-picture, the changeover switch selects outputs of the frame memories 61, 62. An output of the changeover switch 64 is transmitted to a transforming circuit 91 for the CRT display controller 9. The transforming circuit 91 transforms the picture data supplied thereto into signals conforming to the NTSC television system. The picture signals from the transforming circuit 91 are supplied to the CRT display 10.

[0059] The picture buffer memory 4 in the embodiment shown in Fig.8 has two functions, namely the function of the frame buffer and the function of a buffer area to permit the decoder 5 to decode the video bitstream at a moderate rate. The picture buffer memory 4 has a capacity equal to the capacity of three frame buffers, or 128 Kbytes x 3 Kbytes, while the buffer has the capacity on the order of 50 to 60 Kbytes.

[0060] In the embodiment of Fig.8, the initial picture data 11 and the updated picture data P1, for example, are synthesized in the following manner.

[0061] That is, since the initial picture data I1 is the I-picture having the information capable of re-writing the entire picture irrespective of the state of the previous picture. Consequently, if the initial picture data I1 is supplied to the decoder 5, the entire picture is replaced by the initial picture data. On the other hand, the updating picture data is the updating data of particular picture portions inclusive of the position information, and contains data for re-arranging picture data using the values of the directly preceding picture data. The updating picture data may also contain data totally replacing the particular porions of the directly preceding picture data. Above all, if the data of the latter type of the data is used, the particular picture portion may be replaced irrespective of the state of the directly preceding picture.

[0062] The compressed picture data file for the above-mentioned initial picture data I1 and the updating picture data P1 to P8 may be arranged on the sectors of the disc 11 as shown for example in Fig.9.

[0063] With the above-described picture reproducing device according to the present invention, the display of menu items or the like processing operations, so far performed by a graphic display circuit, may be made on a screen of a CRT display by employing the MPEG decoder 5 as the compressed picture decoder.

Claims

1. A video image reproducing apparatus for reproducing compressed video image information, comprising:

   data fetching means (6) for fetching data from a recording medium (11) on which there are recorded at least encoded initial video image data representative of a video image and a plurality of encoded updating video image data in the form of predictive video image data, the encoded updating video image data being capable of updating an initial video image on the premises that the initial video image is present,
   decoding means (5) for decoding the encoded initial video image data and the encoded updating video image data to produce decoded initial video image data and decoded updating video image data, respectively,
   memory means (4, 30) having an updating video image data storage area for storing the decoded updating video image data,
   control means (1) for initially transmitting the initial video image data to the decoding means, subsequently transmitting to the decoding means the particular updating video image data which are necessary to update the initial video image, and causing the memory means to store the decoded updating video image data in the updating video image data storage area,
   display means (9) supplied with the decoded initial video image data for displaying the decoded initial video image data, whereby the control means, in response to a user input, causes selected decoded updating video image data to

be read from the memory means and to be supplied to the display means, and the display means to display the initial video image as updated by the decoded updating video image data, the updating data only rewriting particular portions of the initial video image.

2. The video image reproducing apparatus as claimed in claim 1 further comprising key input means (7), the control means (1) transmitting the updating video image data associated with a selection of a key at the key input means (7) by a user to the display means (9).

3. The video image reproducing apparatus as claimed in claim 1 or 2, wherein the decoding means (5) decodes encoded video image data, the encoded video image data having been produced by transforming an input video image and a differential video image, formed by taking a difference between the input video image and a video image produced by a preset predictive coding, into pre-set coefficient data, and by encoding the resulting coefficient data.

4. A video image reproducing apparatus as claimed in one of the preceding claims, wherein the initial video image includes an image of a menu of a plurality of icons and the updating video image data updates the initial video image so that one or more of the icons is designated as a currently selected icon.

5. A video image reproducing apparatus as claimed in claim 4, if related back to claim 2, wherein full motion, compressed video image data are recorded on the recording medium and wherein the control means (1), in response to a selection of a key of the key operated input means (7), causes particular compressed video image data associated with the currently selected icon to be fetched by the data fetching means (6) from the recording medium, decoded by the decoding means (5), and displayed by the display means (9).

6. A video image reproducing apparatus as claimed in one of the preceding claims, wherein the encoded video image data is encoded according to a format of the Motion Pictures Experts Group (MPEG).

7. Video image reproducing method for reproducing compressed video image information, comprising the following steps:

fetching data from a recording medium (11) on which there are recorded at least encoded initial video image data representative of a video image and a plurality of encoded updating video image data in the form of predective video image data, the encoded updating video image data being capable of updating an initial video image on the premises that the initial video image is present,

decoding the encoded initial video image data and the encoded updating video image data to produce decoded initial video image data and decoded updating video image data, respectively,

storing the decoded updating video image data in an updating video image data storage area of a memory means (4, 30),

initially transmitting the initial video image data for decoding, subsequently transmitting the particular updating video image data for decoding, which are necessary to update the initial video image, and causing the memory means (4, 30) to store the decoded updating video image data in the updating video image data storage area,

supplying the decoded initial video image data for displaying the decoded initial video image data, whereby, in response to an user input, selected decoded updating video image data are caused to be read from the memory means (4, 30) and to be supplied for displaying, and the initial video image as updated by the decoded updating video image data is caused to be displayed, the updating data only rewriting particular portions of the initial video image.

8. Video image reproducing method as claimed in claim 7, further comprising the step of transmitting the updating video image data associated with a selection of a key at a key input means (7) by a user for displaying the updating video image data.

9. Video image reproducing method as claimed in claim 7 or 8, wherein the encoded video image data are decoded, the encoded video image data having been produced by transforming an input video image and a differential video image, formed by taking a difference between the input video image and a video image produced by a preset predective coding, into preset coefficient data, and by encoding the resulting coefficient data.

10. Video image reproducing method as claimed in one of the claims 7 to 9, wherein the initial video image includes image of a menu of a plurality of icons and the updating video image data updates the initial video image so that one or more of the icons is designated as a currently selected icon.

11. Video image reproducing method as claimed in claim 10, if related back to claim 8, wherein full motion, compressed video image data are recorded on the recording medium (11) and wherein, in response to a selection of a key of the key operated

input means (7), particular compressed video image associated with the currently selected icon are caused to be fetched from the recording medium (11), decoded and displayed.

12. Video image reproducing method as claimed in one of the claims 7 to 11, wherein the encoded video image data is encoded according to a format of the Motion Pictures Experts Group (MPEG).

Patentansprüche

1. Vorrichtung zur Wiedergabe von Videobildern zur Wiedergabe einer komprimierten Videobildinformation, welche umfaßt:

   eine Datenabrufeinrichtung (6) zum Abrufen von Daten von einem Aufzeichnungsmedium (11), auf welchem mindestens codierte Anfangsvideobilddaten, welche repräsentativ für ein Videobild sind, und eine Vielzahl von codierten Aktualisierungsvideobilddaten in der Form von vorhergesagten Videobilddaten aufgezeichnet sind, wobei die codierten Aktualisierungsvideobilddaten aufgrund der Voraussetzung, daß das Anfangsvideobild vorhanden ist, geeignet sind, ein Anfangsvideobild zu aktualisieren,

   eine Decodierungseinrichtung (5) zur Decodierung der codierten Anfangsvideobilddaten und der codierten Aktualisierungsvideobilddaten, um jeweils decodierte Anfangsvideobilddaten und decodierte Aktualisierungsvideobilddaten zu erzeugen,

   eine Speichereinrichtung (4, 30) mit einem Speicherbereich für Aktualisierungsvideobilddaten zur Speicherung der decodierten Aktualisierungsvideobilddaten,

   eine Steuereinrichtung (1) zur anfänglichen Übertragung der Aufangsvideobilddaten zu der Decodierungseinrichtung, zur anschließenden Übertragung insbesondere der Aktualisierungsvideobilddaten, welche zur Aktualisierung des Anfangsvideobildes notwendig sind, an die Decodierungseinrichtung, und zur Veranlassung der Speichereinrichtung, die decodierten Aktualisierungsvideobilddaten in dem Speicherbereich für die Aktualisierungsvideobilddaten zu speichern;

   eine Anzeigeeinrichtung (9), welcher die decodierten Anfangsvideobilddaten zur Anzeige der decodierten Anfangsvideobilddaten zugeführt werden, wobei die Steuereinrichtung als Reaktion auf eine Anwendereingabe bewirkt, daß ausgewählte Aktualisierungsvideobilddaten aus der Speichereinrichtung gelesen und der Anzeigeeinrichtung zugeführt werden, und daß die Anzeigeeinrichtung das durch die decodierten Aktualisierungsvideobilddaten aktualisierte Anfangsvideobild anzeigt, wobei die Aktualisierungsdaten nur einzelne Teile des Anfangsvideobildes neu schreiben.

2. Vorrichtung zur Wiedergabe von Videobildern nach Anspruch 1, welche weiterhin eine Tasteneingabeeinrichtung (7) umfaßt, wobei die Steuereinrichtung (1) die Aktualisierungsvideobilddaten, welche mit einer Auswahl einer Taste der Tasteneingabeeinrichtung (7) durch einen Anwender verknüpft sind, an die Anzeigeeinrichtung (9) überträgt.

3. Vorrichtung zur Wiedergabe von Videobildern nach Anspruch 1 oder 2, bei welcher die Decodierungseinrichtung (5) codierte Videobilddaten decodiert, wobei die codierten Videobilddaten durch Umformen eines Eingabevideobildes und eines Differenzvideobildes, das durch Bilden einer Differenz zwischen dem Eingabevideobild und einem Videobild, welches durch eine voreingestellte Prädiktionscodierung erzeugt worden ist, gebildet worden ist, in voreingestellte Koeffizientendaten und durch Codieren der sich ergebenden Koeffizientendaten erzeugt worden sind.

4. Vorrichtung zur Wiedergabe von Videobildern nach einem der vorhergehenden Ansprüche, bei welcher das Anfangsvideobild ein Bild eines Menüs aus einer Vielzahl von Icons enthält und die Aktualisierungsvideobilddaten das Anfangsvideobild derart aktualisieren, daß eines oder mehrere der Icons als ein aktuelles ausgewähltes Icon gekennzeichnet sind.

5. Vorrichtung zur Wiedergabe von Videobildern nach Anspruch 4, wenn dieser auf Anspruch 2 rückbezogen ist, bei welcher komprimierte Vollbewegtvideobilddaten auf dem Aufzeichnungsmedium aufgezeichnet sind, und bei welcher die Steuereinrichtung (1) als Reaktion auf eine Auswahl einer Taste der tastenbetätigten Eingabeeinrichtung (7) bewirkt, daß insbesondere komprimierte Videobilddaten, welche mit dem aktuell ausgewählten Icon verknüpft sind, durch die Datenabfrageeinrichtung (6) von dem Aufzeichnungsmedium (6) abgefragt, durch die Decodierungseinrichtung (5) decodiert und durch die Anzeigeeinrichtung (9) angezeigt werden.

6. Vorrichtung zur Wiedergabe von Videobildern nach einem der vorhergehenden Ansprüche, bei welcher die codierten Videobilddaten entsprechend einem

Format der Motion Picture Experts Group (MPEG) codiert sind.

7. Wiedergabeverfahren für Videobilder zur Wiedergabe einer komprimierten Videobildinformation, welches die folgenden Schritte umfaßt:

Abrufen von Daten von einem Aufzeichnungsmedium (11), auf welchem mindestens codierte Anfangsvideobilddaten, welche repräsentativ für ein Videobild sind, und eine Vielzahl von codierten Aktualisierungsvideobilddaten in der Form von vorhergesagten Videobilddaten aufgezeichnet sind, wobei die codierten Aktualisierungsvideobilddaten aufgrund der Voraussetzung, daß das Anfangsvideobild vorhanden ist, geeignet sind, ein Anfangsvideobild zu aktualisieren,

Decodieren der codierten Anfangsvideobilddaten und der codierten Aktualisierungsvideobilddaten, um jeweils decodierte Anfangsvideobilddaten und decodierte Aktualisierungsvideobilddaten zu erzeugen,

Speichern der decodierten Aktualisierungsvideobilddaten in einem Speicherbereich für Aktualisierungsvideobilddaten der Speichereinrichtung (4, 30),

anfängliches Übertragen der Anfangsvideobilddaten zur Decodierung, anschließende Übertragung insbesondere der Aktualisierungsvideobilddaten, welche zur Aktualisierung des Anfangsvideobildes notwendig sind, zur Decodierung, und Veranlassen der Speichereinrichtung (4, 30), die decodierten Aktualisierungsvideobilddaten in dem Speicherbereich für die Aktualisierungsvideobilddaten zu speichern;

Zuführen der decodierten Anfangsvideobilddaten zur Anzeige der decodierten Anfangsvideobilddaten, wobei die Steuereinrichtung als Reaktion auf eine Anwendereingabe bewirkt, daß ausgewählte Aktualisierungsvideobilddaten aus der Speichereinrichtung (4, 30) gelesen werden und zur Anzeige bereitgestellt werden, und bewirkt, daß das durch die decodierten Aktualisierungsvideobilddaten aktualisierte Anfangsvideobild angezeigt wird, wobei die Aktualisierungsdaten nur einzelne Teile des Anfangsvideobildes neu schreiben.

8. Wiedergabeverfahren für Videobilder nach Anspruch 7, welches weiterhin den Schritt der Übertragung der Aktualisierungsvideobilddaten, welche mit einer Auswahl einer Taste einer Tasteneingabeeinrichtung (7) durch einen Anwender verknüpft sind, zur Anzeige der Aktualisierungsvideobilddaten umfaßt.

9. Wiedergabevorfahren für Videobilder nach Anspruch 7 oder 8, bei welchem die codierten Videobilddaten decodiert werden, wobei die codierten Videobilddaten durch Umformen eines Eingabevideobildes und eines Differenzvideobildes, das durch Bilden einer Differenz zwischen dem Eingabevideobild und einem Videobild, welches durch eine voreingestellte Prädiktionscodierung gebildet worden ist, in voreingestellte Koeffizientendaten und durch Codieren der sich ergebenden Koeffizientendaten erzeugt worden sind.

10. Wiedergabeverfahren für Videobilder nach einem der Ansprüche 7 bis 9, bei welchem das Anfangsvideobild ein Bild eines Menüs aus einer Vielzahl von Icons enthält und die Aktualisierungsvideobilddaten das Anfangsvideobild derart aktualisieren, daß eines oder mehrere der Icons als ein aktuelles ausgewähltes Icon gekennzeichnet sind.

11. Wiedergabeverfahren für Videobilder nach Anspruch 10, wenn dieser auf Anspruch 8 rückbezogen ist, bei welchem komprimierte Vollbewegtvideobilddaten auf dem Aufzeichnungsmedium aufgezeichnet sind, und bei welchem als Reaktion auf eine Auswahl einer Taste der tastenbetätigten Eingabeeinrichtung (7) veranlaßt wird, daß insbesondere komprimierte Videobilddaten, welche mit dem aktuell ausgewählten Icon verknüpft sind, von dem Aufzeichnungsmedium (11) abgefragt, decodiert und angezeigt werden.

12. Wiedergabeverfahren für Videobilder nach einem der Ansprüche 7 bis 11, bei welchem die codierten Videobilddaten entsprechend einem Format der Motion Picture Experts Group (MPEG) codiert werden.

Revendications

1. Appareil de reproduction d'image vidéo pour reproduire des informations d'image vidéo compressées, comprenant :

un moyen d'acquisition de données (6) pour acquérir des données à partir d'un support d'enregistrement (11) sur lequel il y a enregistré au moins des données d'image vidéo initiales codées représentatives d'une image vidéo et une pluralité de données d'image vidéo de mise à jour codées sous la forme de données d'image vidéo prédictives, les données d'image vidéo de mise à jour codées étant capable de mettre

à jour une image vidéo initiale sur les prémisses que l'image vidéo initiale est présente,
un moyen de décodage (5) pour décoder les données d'image vidéo initiales codées et les données d'image vidéo de mise à jour codées pour produire respectivement des données d'image vidéo initiales décodées et des données d'image vidéo de mise à jour décodées,
un moyen de mémoire (4,30) ayant une zone de stockage de données d'image vidéo de mise à jour pour stocker les données d'image de mise à jour codées,
un moyen de commande (1) pour transmettre initialement les données d'image vidéo initiales au moyen de décodage, pour transmettre par conséquent au moyen de décodage les données d'image vidéo de mise à jour particulières qui sont nécessaires pour mettre à jour l'image vidéo initiale, et pour forcer le moyen de mémoire à stocker les données d'image vidéo de mise à jour décodées dans la zone de stockage de données d'image vidéo de mise à jour,
un moyen d'affichage (9) recevant les données d'image vidéo initiales décodées pour afficher les données d'image vidéo initiales décodées, pour que le moyen de commande, en réponse à l'entrée de l'utilisateur, force les données d'image vidéo de mise à jour décodées sélectionnées à être lues à partir du moyen de mémoire et à être fournies au moyen d'affichage, et le moyen d'affichage à afficher l'image vidéo initiale comme mise à jour par les données d'image vidéo de mise à jour décodées, les parties particulières de réécriture seulement des données de mise à jour de l'image vidéo initiale.

2. Appareil de reproduction d'image vidéo selon la revendication 1 comprenant en outre un moyen d'entrée de touche (7), le moyen de commande (1) transmettant les données d'image vidéo de mise à jour associées à une sélection d'une touche sur le moyen d'entrée de touche (7) par un utilisateur au moyen d'affichage (9).

3. Appareil de reproduction d'image vidéo selon la revendication 1 ou 2, dans lequel le moyen de décodage (5) décode des données d'image vidéo codées, les données d'image vidéo codées ayant été produites en transformant une image vidéo d'entrée et une image vidéo différentielle, formée en prenant une différence entre l'image vidéo d'entrée et une image vidéo produite par un codage prédictif préétabli, en données de coefficient pré-établies, et en codant les données de coefficient résultantes.

4. Appareil de reproduction d'image vidéo selon l'une quelconque des revendications précédentes, dans lequel l'image vidéo initiale comprend une image d'un menu d'une pluralité d'icônes et les données d'image de vidéo de mise à jour mettent à jour l'image vidéo initiale pour qu'une ou plusieurs des icônes soit désignée comme une icône sélectionnée actuellement.

5. Appareil de reproduction d'image vidéo selon la revendication 4, si elle concerne de nouveau la revendication 2, dans lequel des données d'image vidéo compressées de déplacement entier sont enregistrées sur le support d'enregistrement et dans lequel le moyen de commande (1), en réponse à une sélection d'une touche du moyen d'entrée de touche actionnée (7), force des données d'image vidéo compressées particulières associées à l'icône sélectionnée actuellement à être acquises par le moyen d'acquisition de données (6) à partir du support d'enregistrement, à être décodées par le moyen de décodage (5), et à être affichées par le moyen d'affichage (9).

6. Appareil de reproduction d'image vidéo selon l'une quelconque des revendications précédentes, dans lequel les données d'image vidéo codées sont codées selon un format du Motion Pictures Experts Group (MPEG).

7. Procédé de reproduction d'image vidéo pour reproduire des informations d'image vidéo compressées, comprenant les étapes de :

acquisition de données à partir d'un support d'enregistrement (11) sur lequel il y a enregistré au moins des données d'image vidéo initiales codées représentatives d'une image vidéo et une pluralité de données d'image vidéo de mise à jour codées sous la forme de données d'image vidéo prédictives, les données d'image vidéo de mise à jour codées étant capables de mettre à jour une image vidéo initiale sur les prémisses que l'image vidéo initiale est présente,
décodage des données d'image vidéo initiales codées et des données d'image vidéo mises à jour codées pour produire respectivement des données d'image vidéo initiales décodées et des données d'image de mise à jour décodées,
stockage des données d'image vidéo de mise à jour décodées dans une zone de stockage de données d'image vidéo de mise à jour d'un moyen de mémoire (4, 30),
transmission initialement des données d'image vidéo initiales pour décoder, transmission par la suite des données d'image vidéo de mise à jour particulières pour le décodage, qui sont nécessaires pour mettre à jour l'image vidéo initiale, et obligation par le moyen de mémoire (4,30) à stocker les données d'image vidéo de

mise à jour décodées dans la zone de stockage de données d'image vidéo de mise à jour, fourniture des données d'image vidéo initiales décodées pour afficher les données d'image vidéo initiales décodées, pour que, en réponse à une entrée d'utilisateur, des données d'image vidéo de mise à jour décodées sélectionnées soient forcées à être lues à partir du moyen de mémoire (4,30) et à être fournies pour l'affichage, et que l'image vidéo initiale comme mise à jour par les données d'image de mise à jour décodées soit forcée à être affichée, en ne réécrivant que des parties particulières des données de mise à jour de l'image vidéo initiale.

8. Procédé de reproduction d'image de vidéo selon la revendication 7, comprenant en outre l'étape de transmission des données d'image vidéo de mise à jour associées à une sélection d'une touche sur un moyen d'entrée de touche (7) par un utilisateur pour afficher les données d'image vidéo de mise à jour.

9. Procédé de reproduction d'image vidéo selon la revendication 7 ou 8, dans lequel les données d'image vidéo codées sont décodées, les données d'image vidéo codées ayant été produites en transformant une image vidéo d'entrée et une image vidéo différentielle, formée en prenant une différence entre l'image vidéo d'entrée et une image vidéo produite par un codage prédictif pré-établi, en données de coefficient préétablies, et en codant les données de coefficient résultantes.

10. Procédé de reproduction d'image vidéo selon l'une quelconque des revendications 7 à 9 dans lequel l'image vidéo initiale comprend une image d'un menu d'une pluralité d'icônes et les données d'image de mise à jour mettent à jour l'image vidéo initiale pour qu'une ou plusieurs des icônes soit désignée comme une icône sélectionnée actuellement.

11. Procédé de reproduction d'image vidéo selon la revendication 10, si elle est concernée de nouveau par la revendication 8, dans lequel des données d'image vidéo compressées de mouvement entier sont enregistrées sur le support d'enregistrement (11) et dans lequel, en réponse à une sélection d'une touche du moyen d'entrée de touche actionnée (7), des images vidéo compressées particulières associée à l'icône sélectionnée actuellement sont forcées à être acquises à partir du support d'enregistrement (11), à être décodées et à être affichées.

12. Procédé de reproduction d'image vidéo selon l'une quelconque des revendications 7 à 11, dans lequel les données d'image vidéo codées sont codées selon un format du Motion Pictures Experts Group (MPEG).

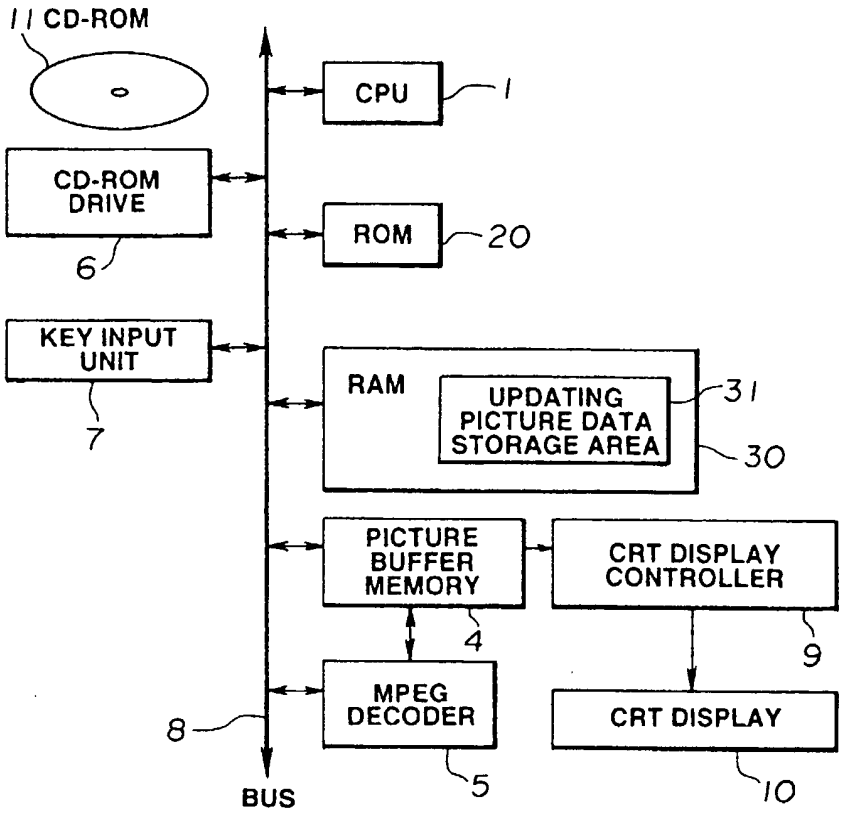
11 CD-ROM
CPU
1
CD-ROM DRIVE
6
ROM
20
KEY INPUT UNIT
7
RAM
UPDATING PICTURE DATA STORAGE AREA
31
30
PICTURE BUFFER MEMORY
4
CRT DISPLAY CONTROLLER
9
MPEG DECODER
5
CRT DISPLAY
10
8
BUS

FIG.1

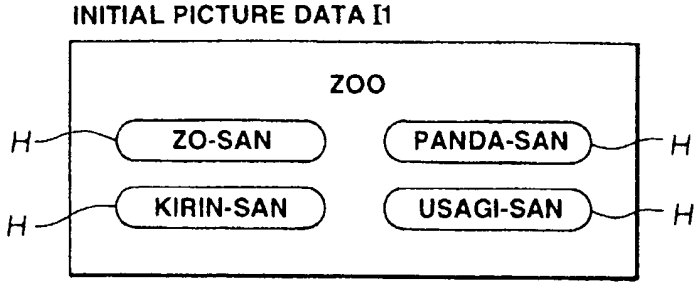
INITIAL PICTURE DATA I1
ZOO
H
ZO-SAN
PANDA-SAN
H
H
KIRIN-SAN
USAGI-SAN
H

FIG.2

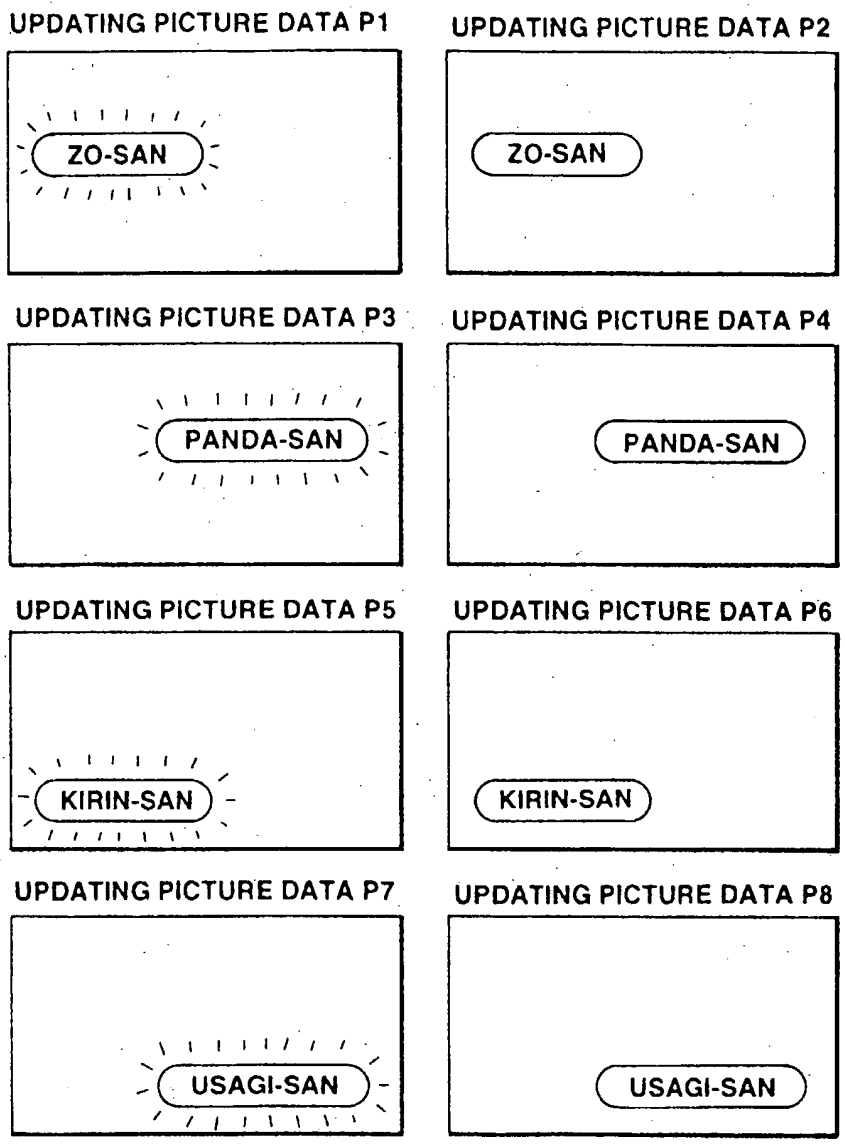
UPDATING PICTURE DATA P1
ZO-SAN
UPDATING PICTURE DATA P2
ZO-SAN
UPDATING PICTURE DATA P3
PANDA-SAN
UPDATING PICTURE DATA P4
PANDA-SAN
UPDATING PICTURE DATA P5
KIRIN-SAN
UPDATING PICTURE DATA P6
KIRIN-SAN
UPDATING PICTURE DATA P7
USAGI-SAN
UPDATING PICTURE DATA P8
USAGI-SAN

FIG.3

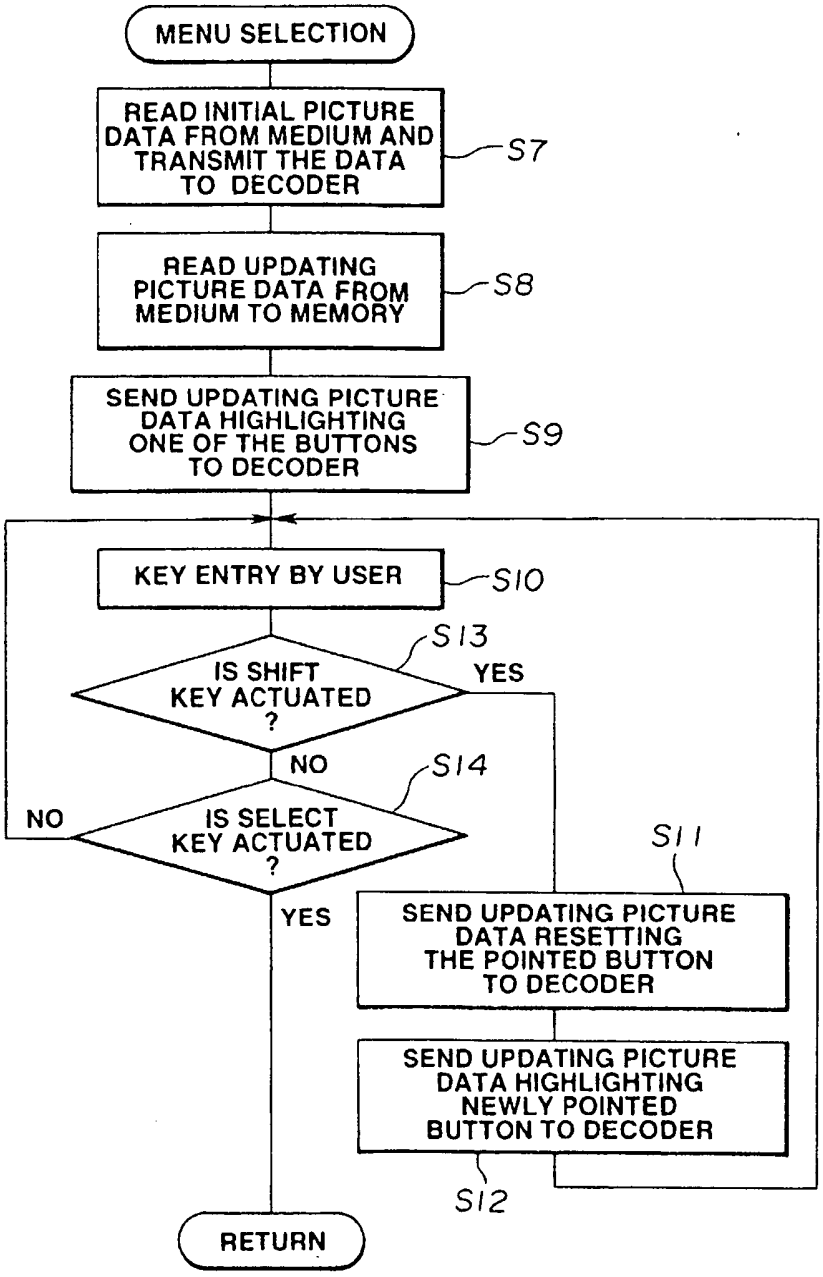
MENU SELECTION
READ INITIAL PICTURE DATA FROM MEDIUM AND TRANSMIT THE DATA TO DECODER
S7
READ UPDATING PICTURE DATA FROM MEDIUM TO MEMORY
S8
SEND UPDATING PICTURE DATA HIGHLIGHTING ONE OF THE BUTTONS TO DECODER
S9
KEY ENTRY BY USER
S10
S13
IS SHIFT KEY ACTUATED ?
YES
NO
S14
NO
IS SELECT KEY ACTUATED ?
YES
S11
SEND UPDATING PICTURE DATA RESETTING THE POINTED BUTTON TO DECODER
SEND UPDATING PICTURE DATA HIGHLIGHTING NEWLY POINTED BUTTON TO DECODER
S12
RETURN

FIG.4

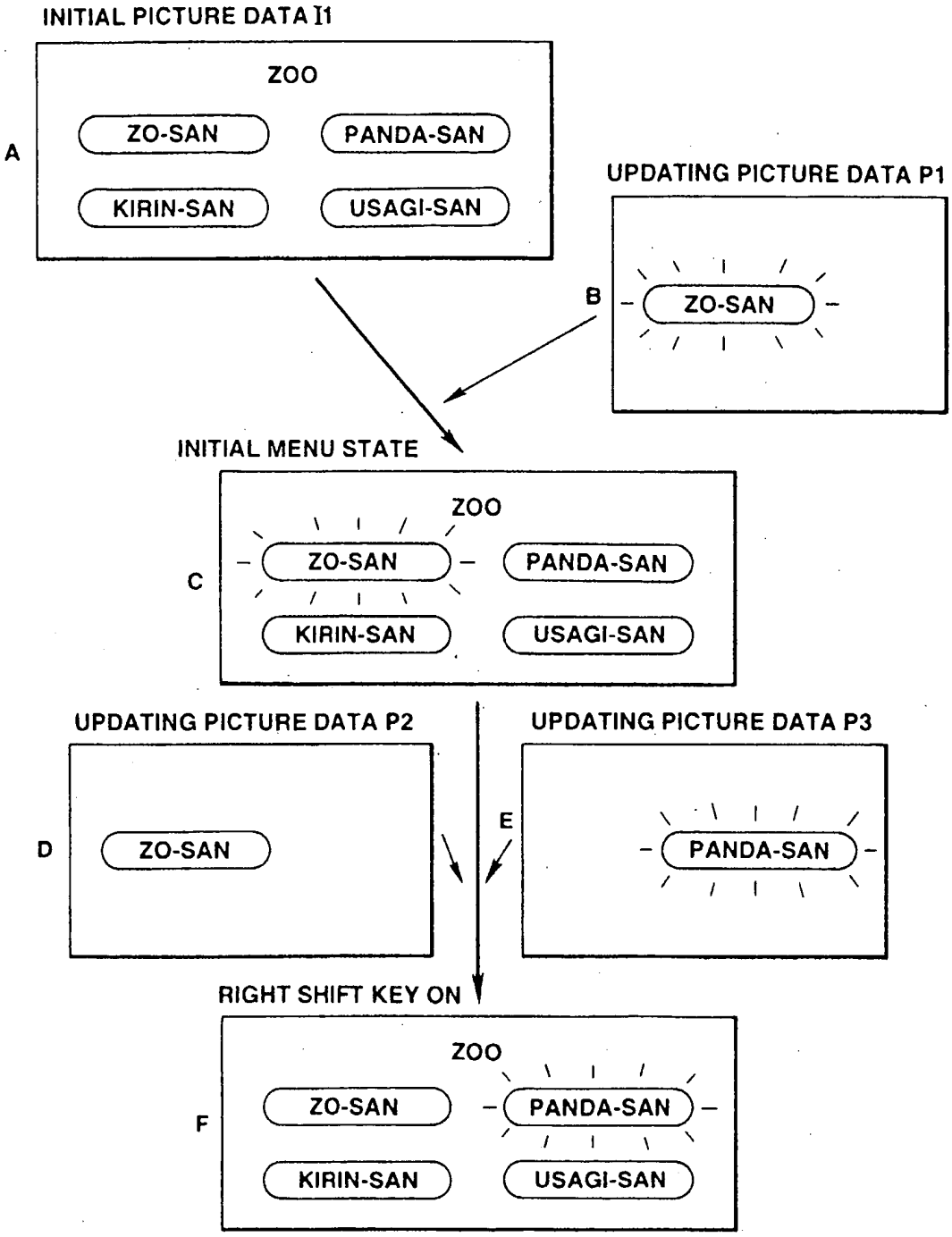
INITIAL PICTURE DATA I1
A
ZOO
ZO-SAN
PANDA-SAN
KIRIN-SAN
USAGI-SAN
UPDATING PICTURE DATA P1
B
ZO-SAN
INITIAL MENU STATE
C
ZOO
ZO-SAN
PANDA-SAN
KIRIN-SAN
USAGI-SAN
UPDATING PICTURE DATA P2
D
ZO-SAN
E
UPDATING PICTURE DATA P3
PANDA-SAN
RIGHT SHIFT KEY ON
F
ZOO
ZO-SAN
PANDA-SAN
KIRIN-SAN
USAGI-SAN

FIG.5

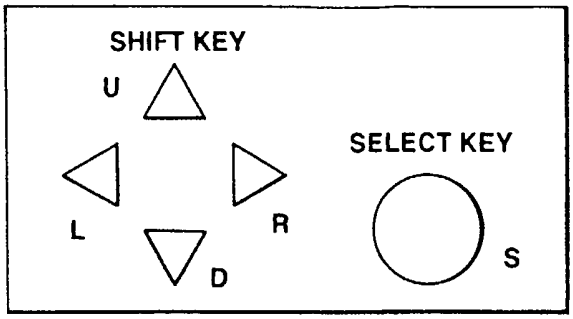
SHIFT KEY
U
L
R
D
SELECT KEY
S

FIG.6

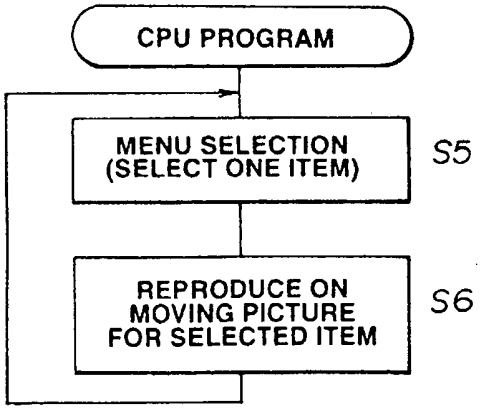
CPU PROGRAM
MENU SELECTION (SELECT ONE ITEM)
S5
REPRODUCE ON MOVING PICTURE FOR SELECTED ITEM
S6

FIG.7

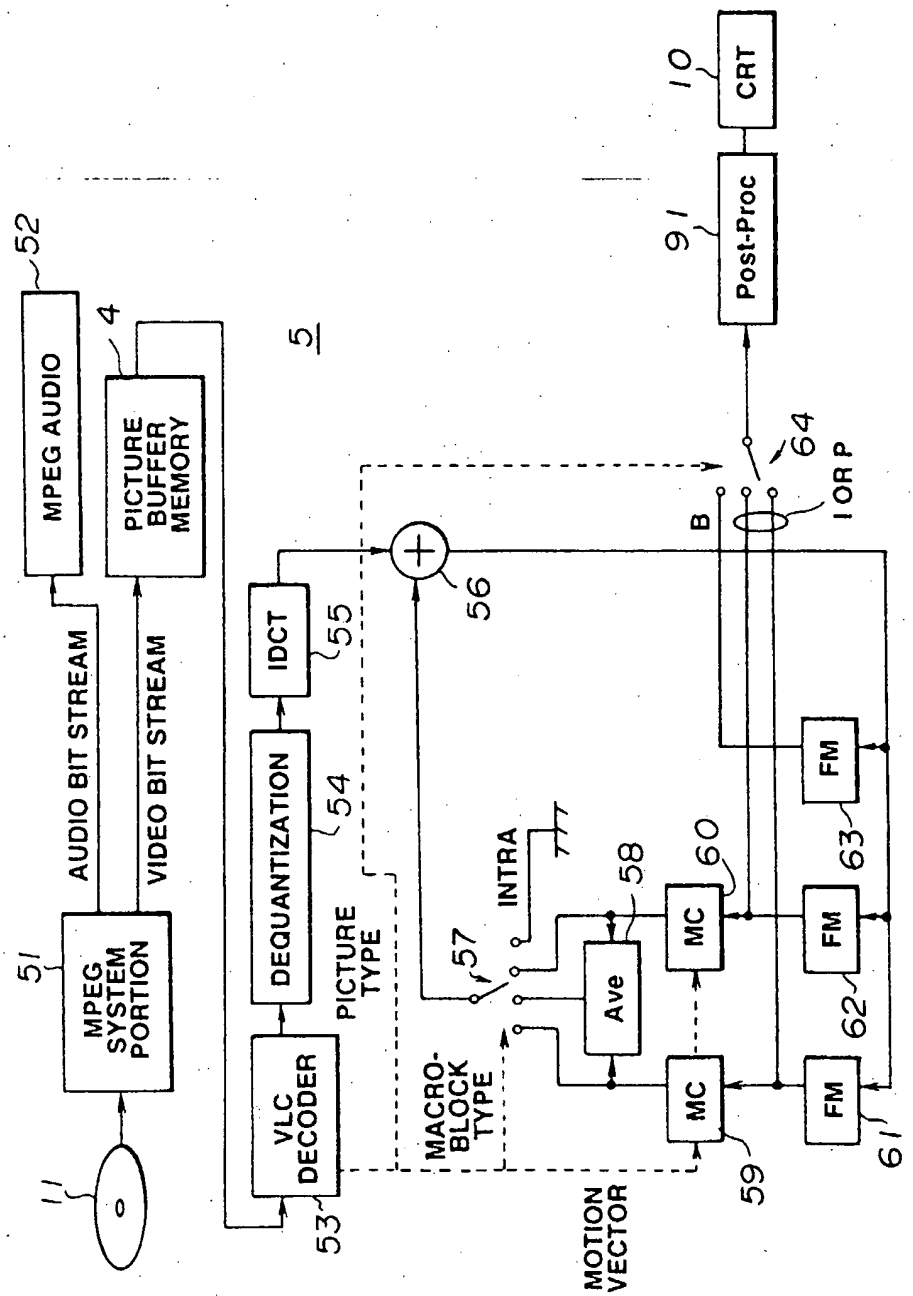
MPEG AUDIO
PICTURE BUFFER MEMORY
AUDIO BIT STREAM
VIDEO BIT STREAM
MPEG SYSTEM PORTION
VLC DECODER
DEQUANTIZATION
IDCT
PICTURE TYPE
MACRO-BLOCK TYPE
MOTION VECTOR
INTRA
Ave
MC
MC
FM
FM
FM
B
I OR P
Post-Proc
CRT
5
11
51
52
53
54
55
56
57
58
59
60
61
62
63
64
91
10
4

FIG.8

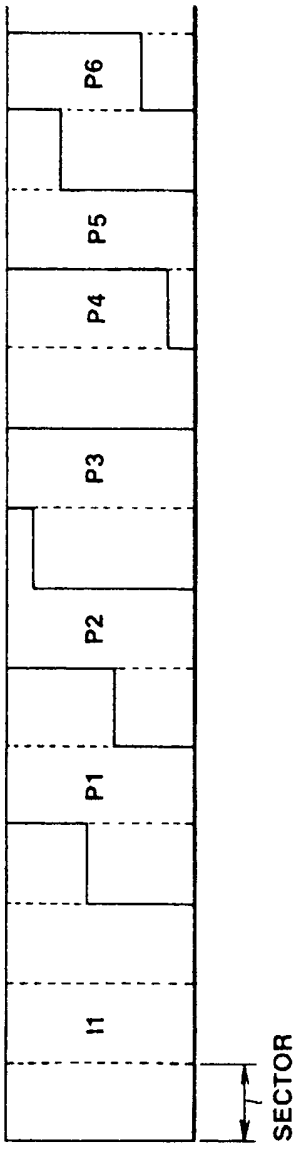

FIG.9